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The effect of improved marine wind forecasts on wave forecasts from WAM

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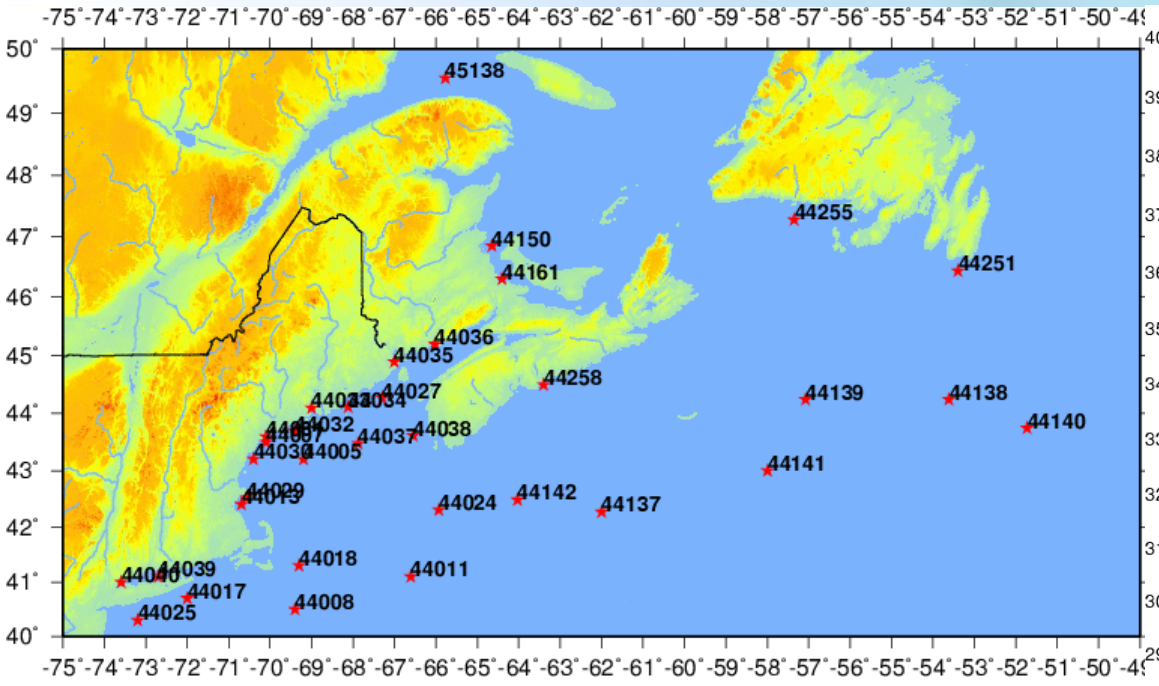
Outline

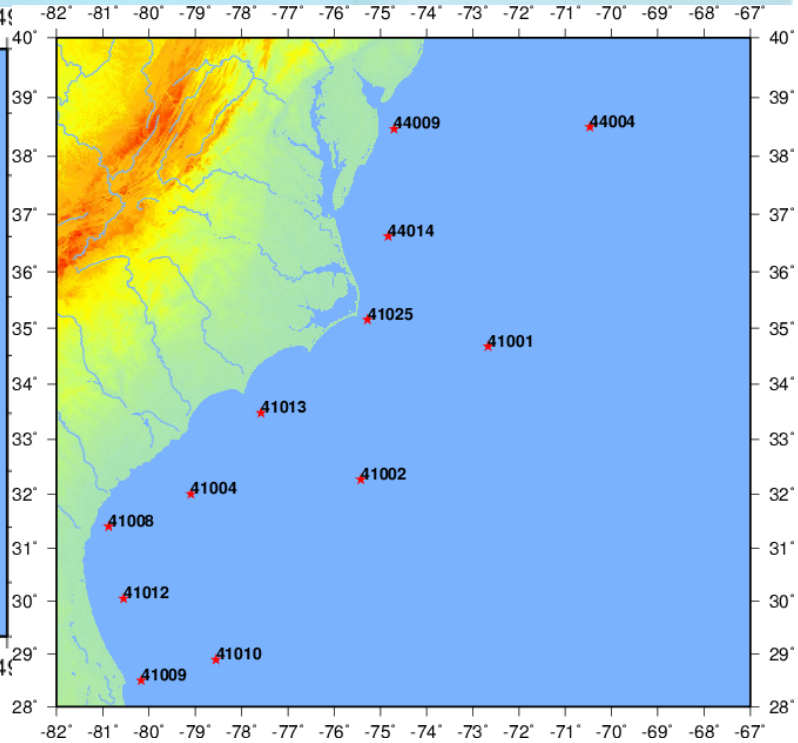
- MOS Marine wind forecasts
- Converting MOS winds to WAM grid
- Gridded wind verification for L. Erie
- Case example of WAM run with MOS winds
- Conclusions and next steps

MOS marine wind equations

- Model Output Statistics (MOS)
  - Accounts for biases in model forecasts
  - Relates forecast directly to buoy obs
- Predictand: U, V, and scalar speed
- Predictors: winds and others from GEM regional
- All buoys on east, west coast and Great Lakes
- Equations valid for buoy level – worked best
- Dependent sample – 3 years; 2 years indep.
- Separate equations for each buoy, each forecast projection 0-48 h.
- Results:

Buoy locations – East coast

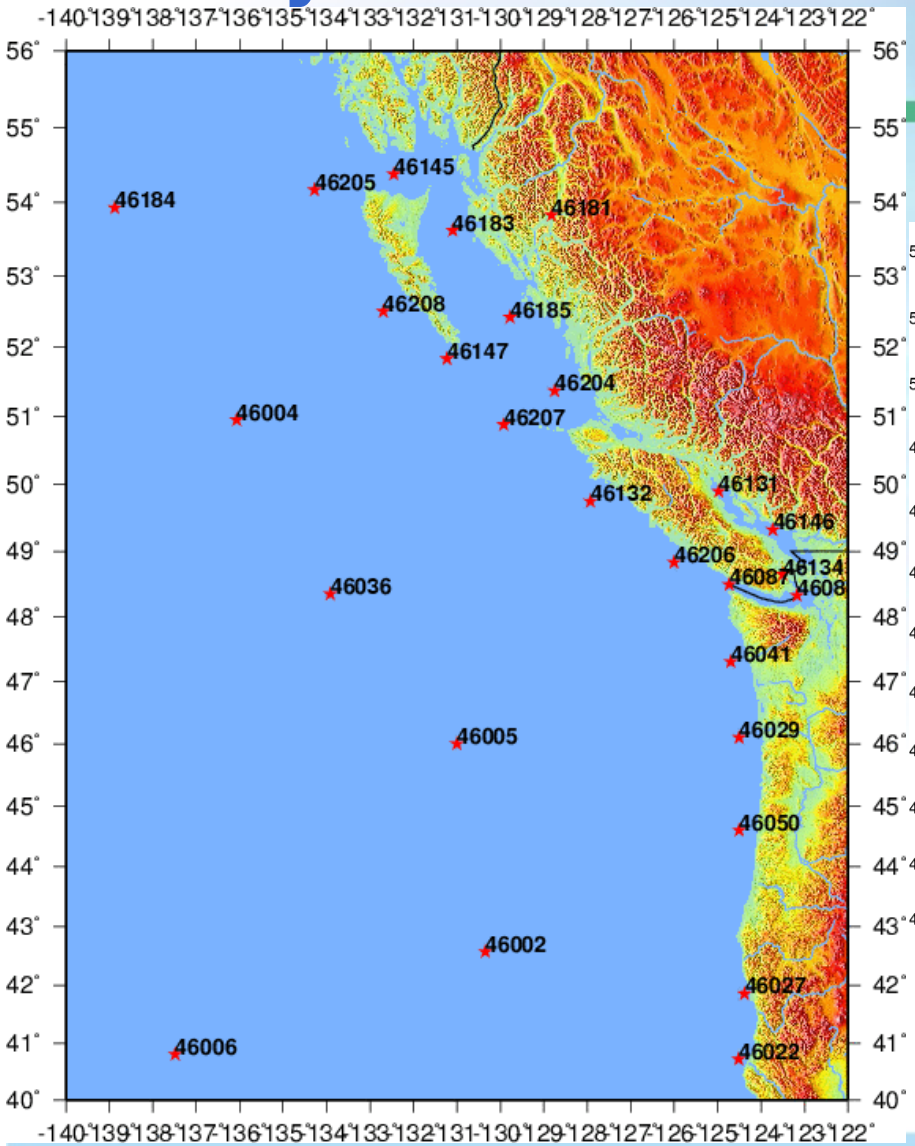


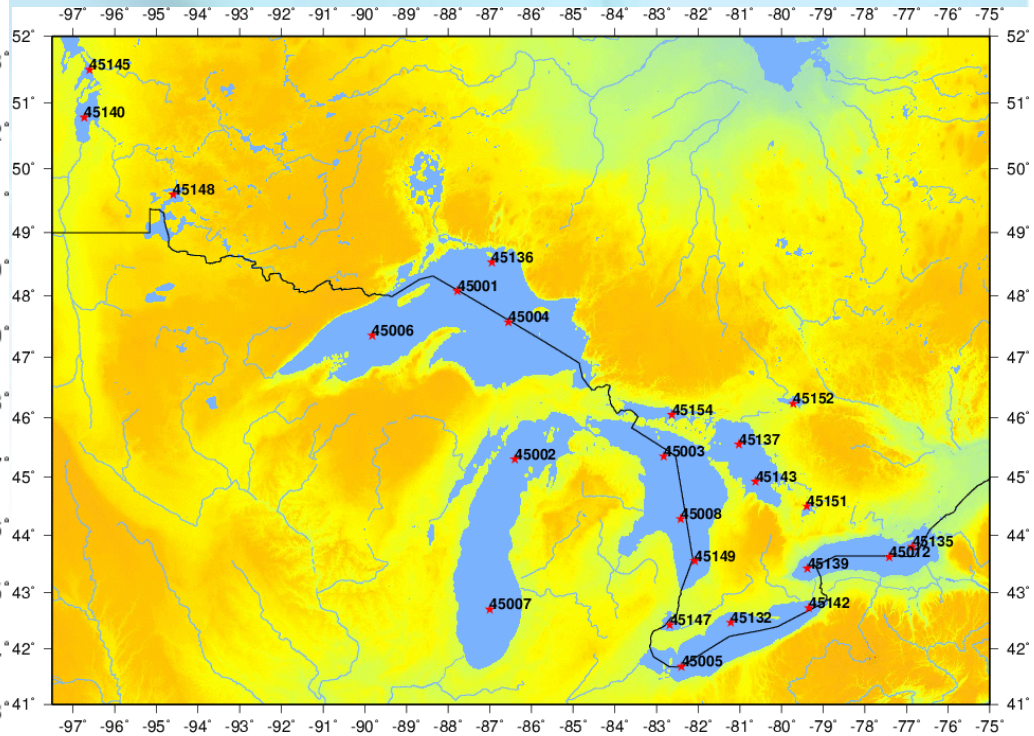


Environment Canada Environnement Canada

Canada

Buoy locations – West coast, Gt Lakes

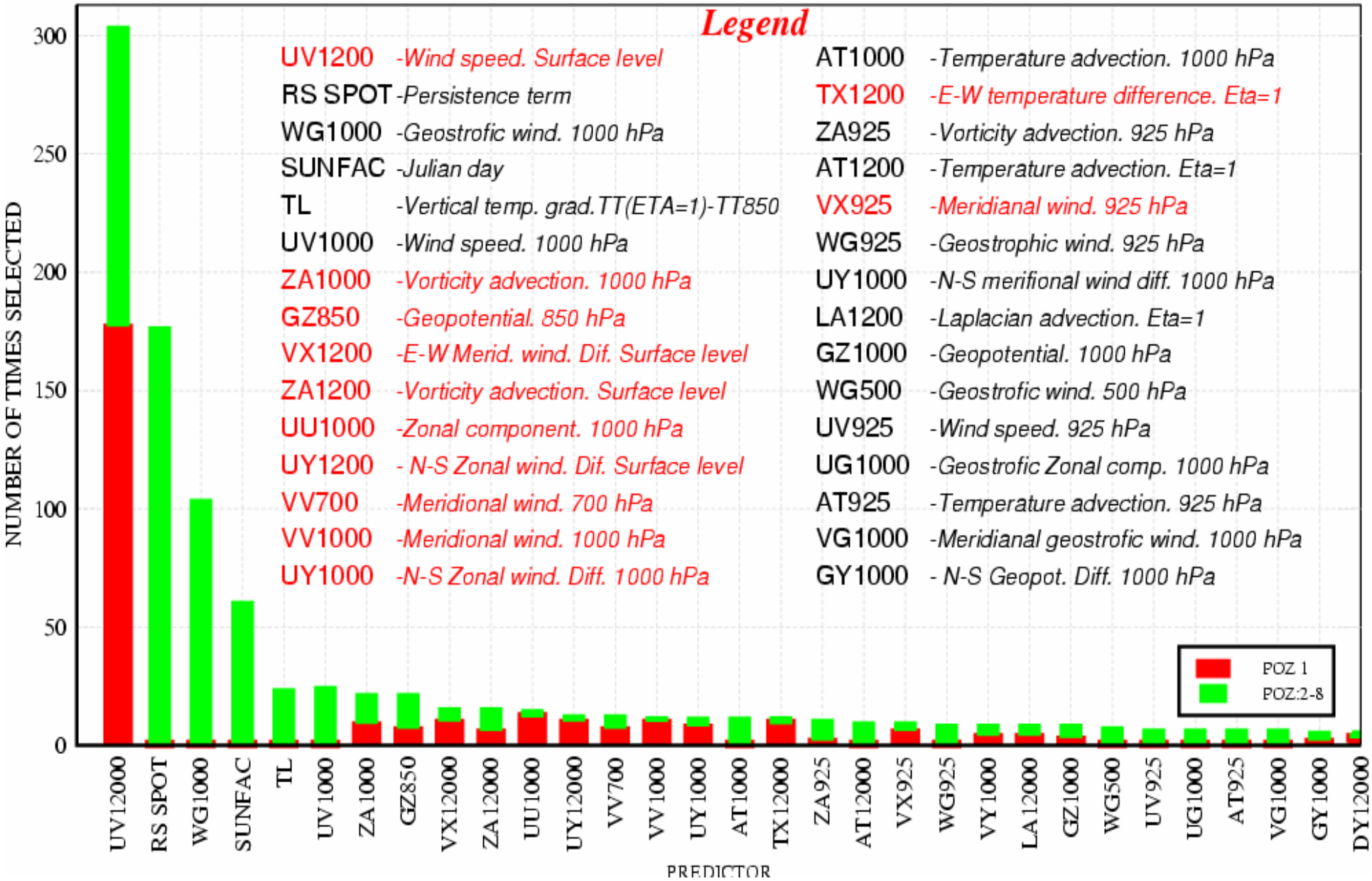




FREQUENCY OF PREDICTORS SELECTED

WIND SPEED

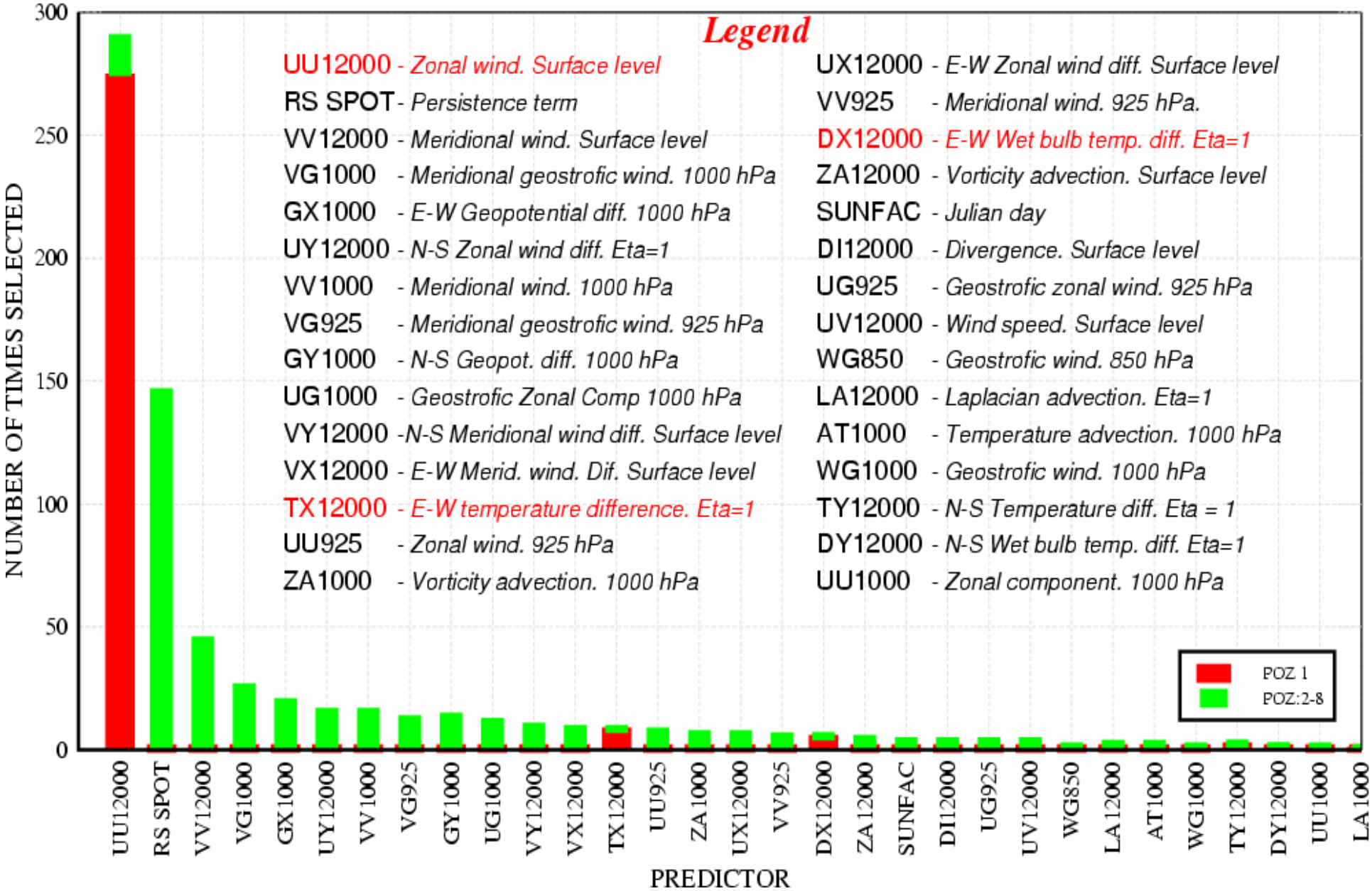
PARAMETER wnm6s RUN 00 V_05



FREQUENCY OF PREDICTORS SELECTED

U component

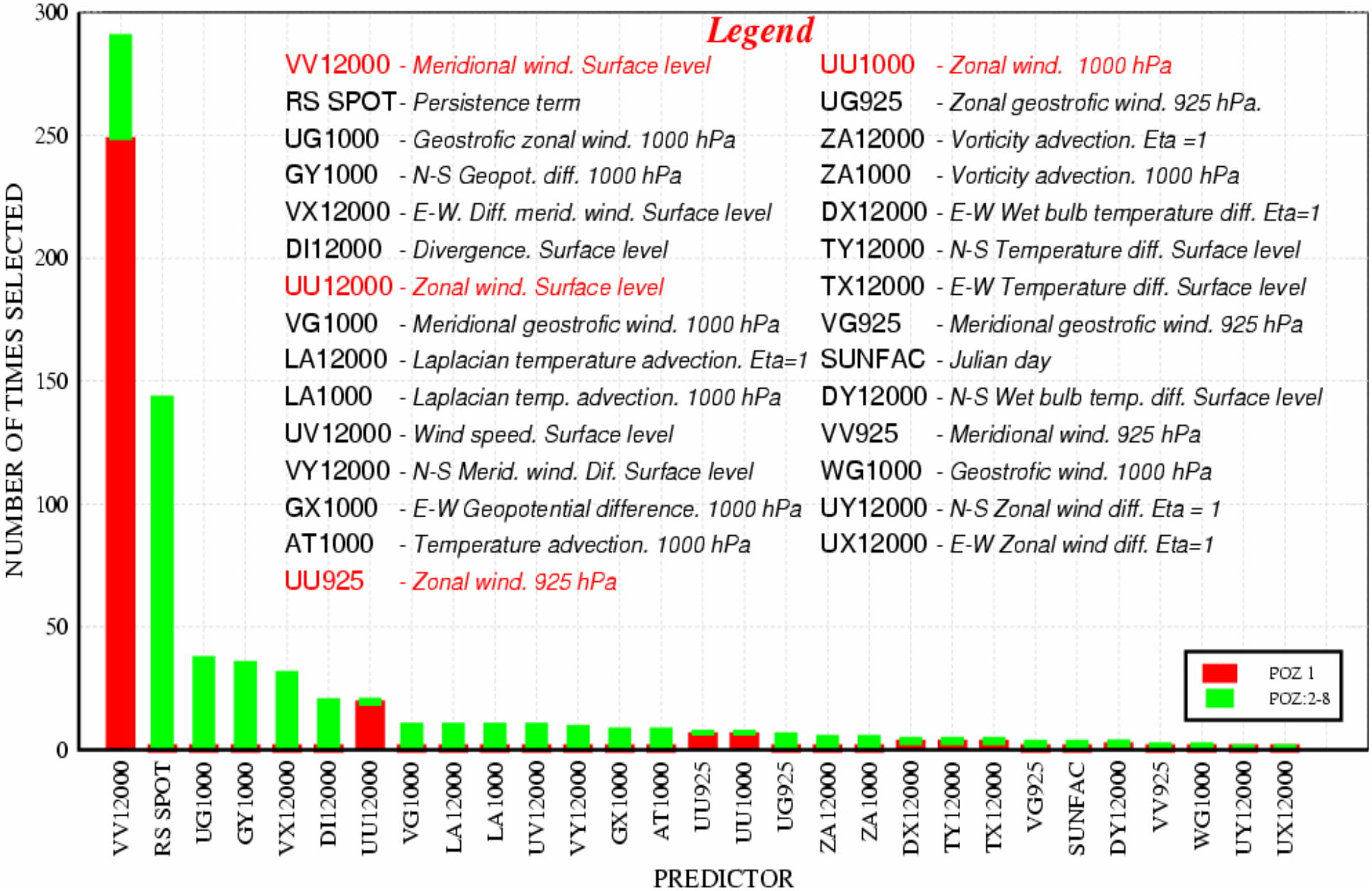
PARAMETER wnm6u RUN 00 V_05



FREQUENCY OF PREDICTORS SELECTED

V component

PARAMETER wnm6v RUN 00 V_05

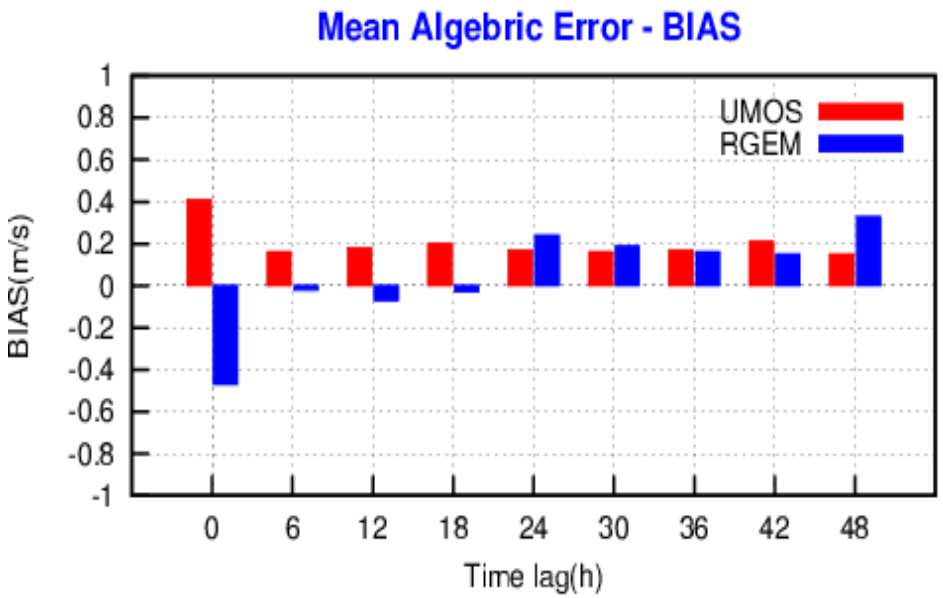


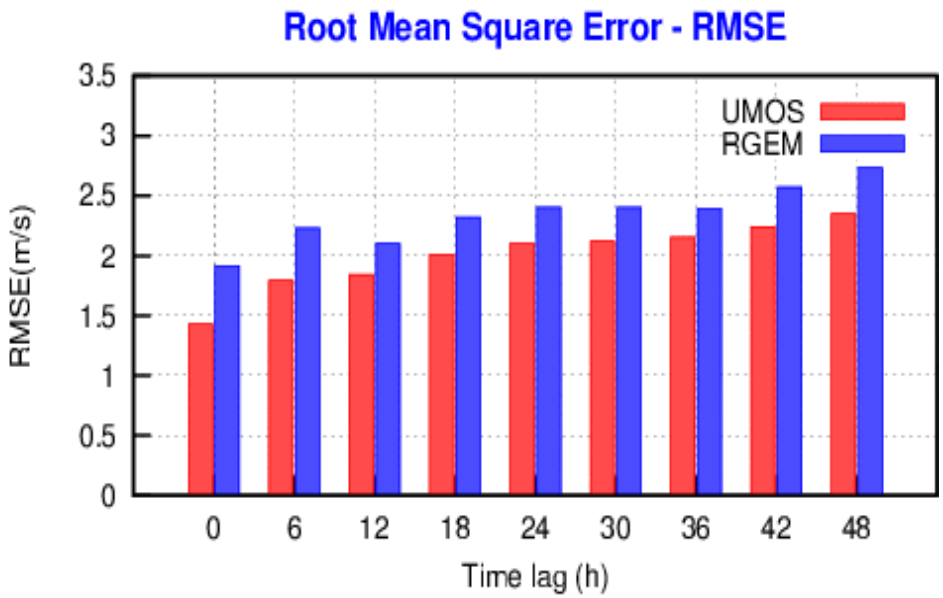
UMOS-A versus RGEM - standard level

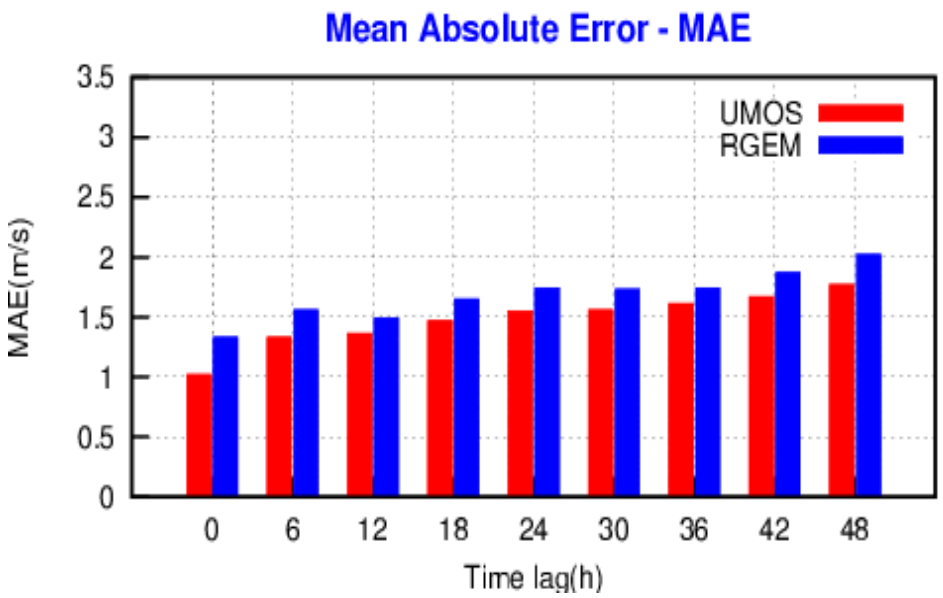
All buoys

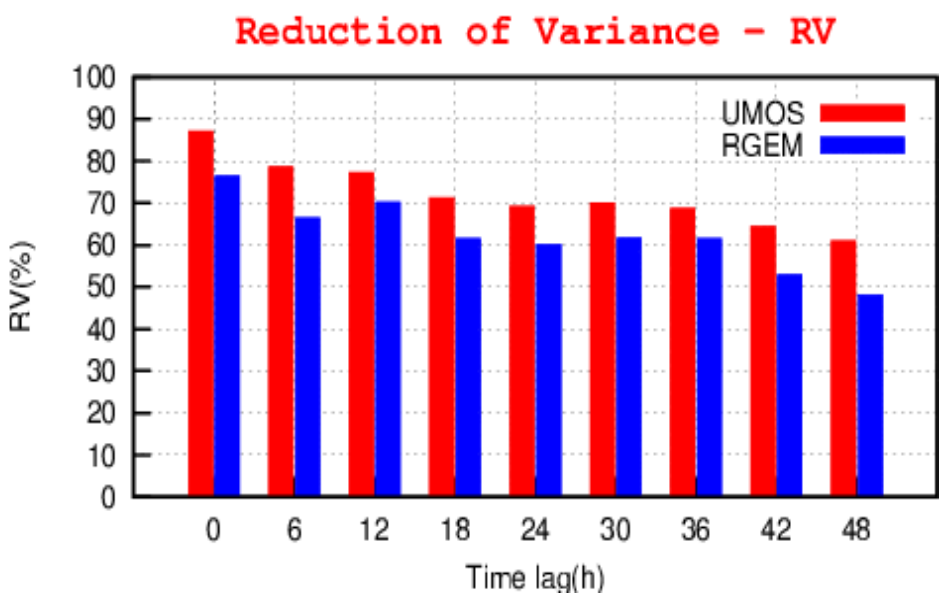
WMO TRANSFORMATION

EE - 00000







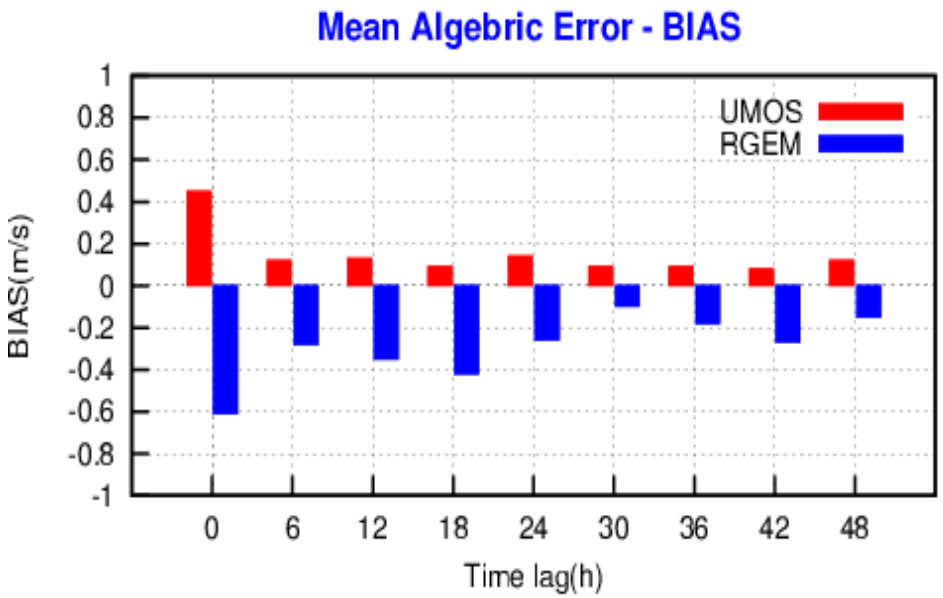


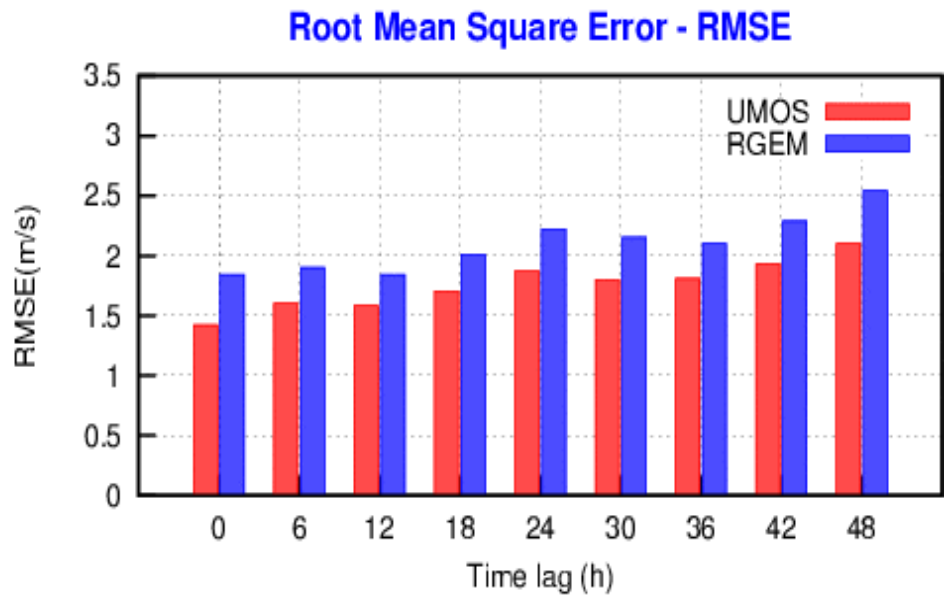
UMOS-A versus RGEM - standard level

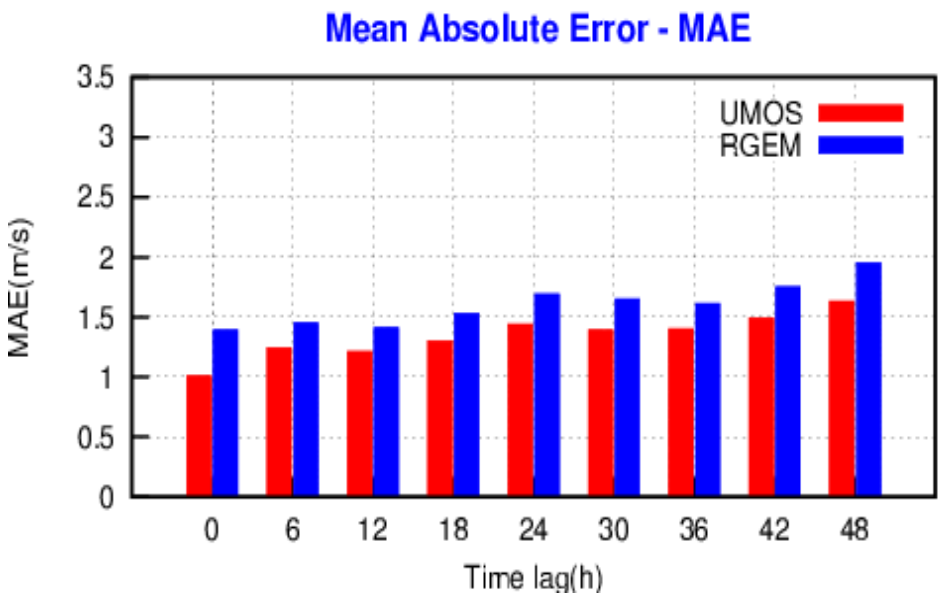
Lakes – all buoys

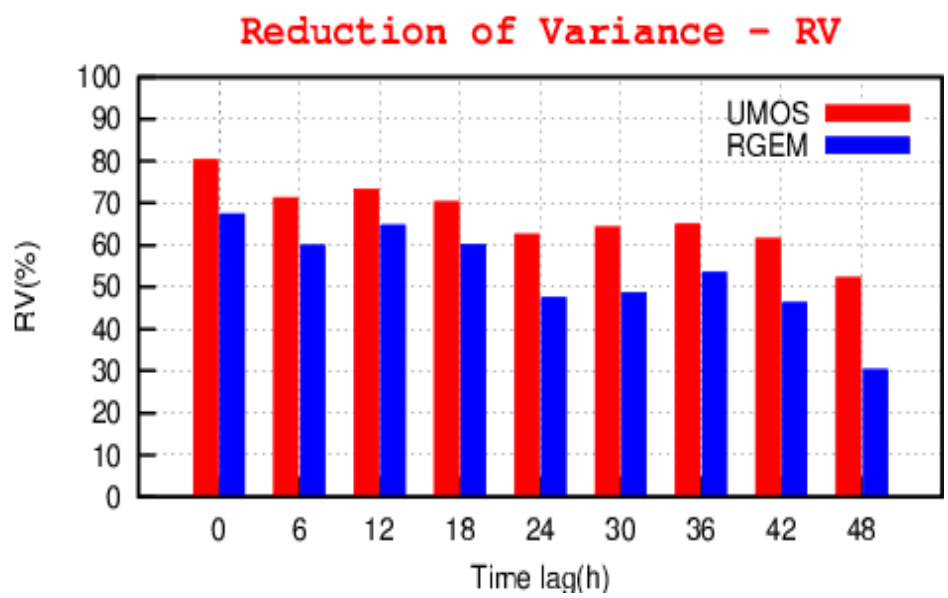
WMO TRANSFORMATION

LK - 00000



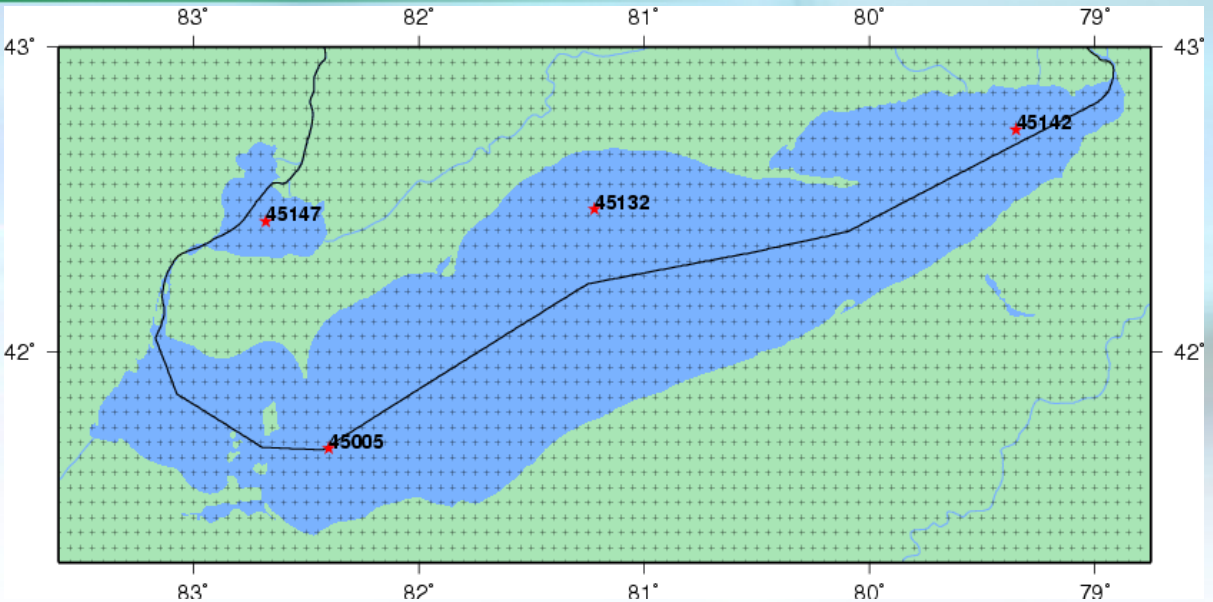


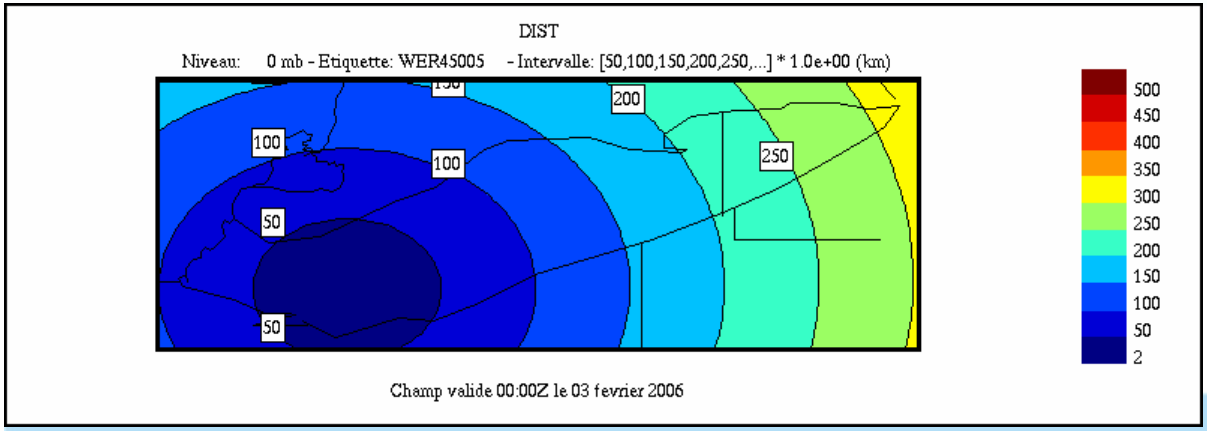




Conversion to WAM grid – L. Erie

-Apply equations for all 4 buoys at each gridpt
-> 4 estimates of speed, U,V at each point
-final estimate is weighted avg of 4 estimates
-weights are inverse distance squared.

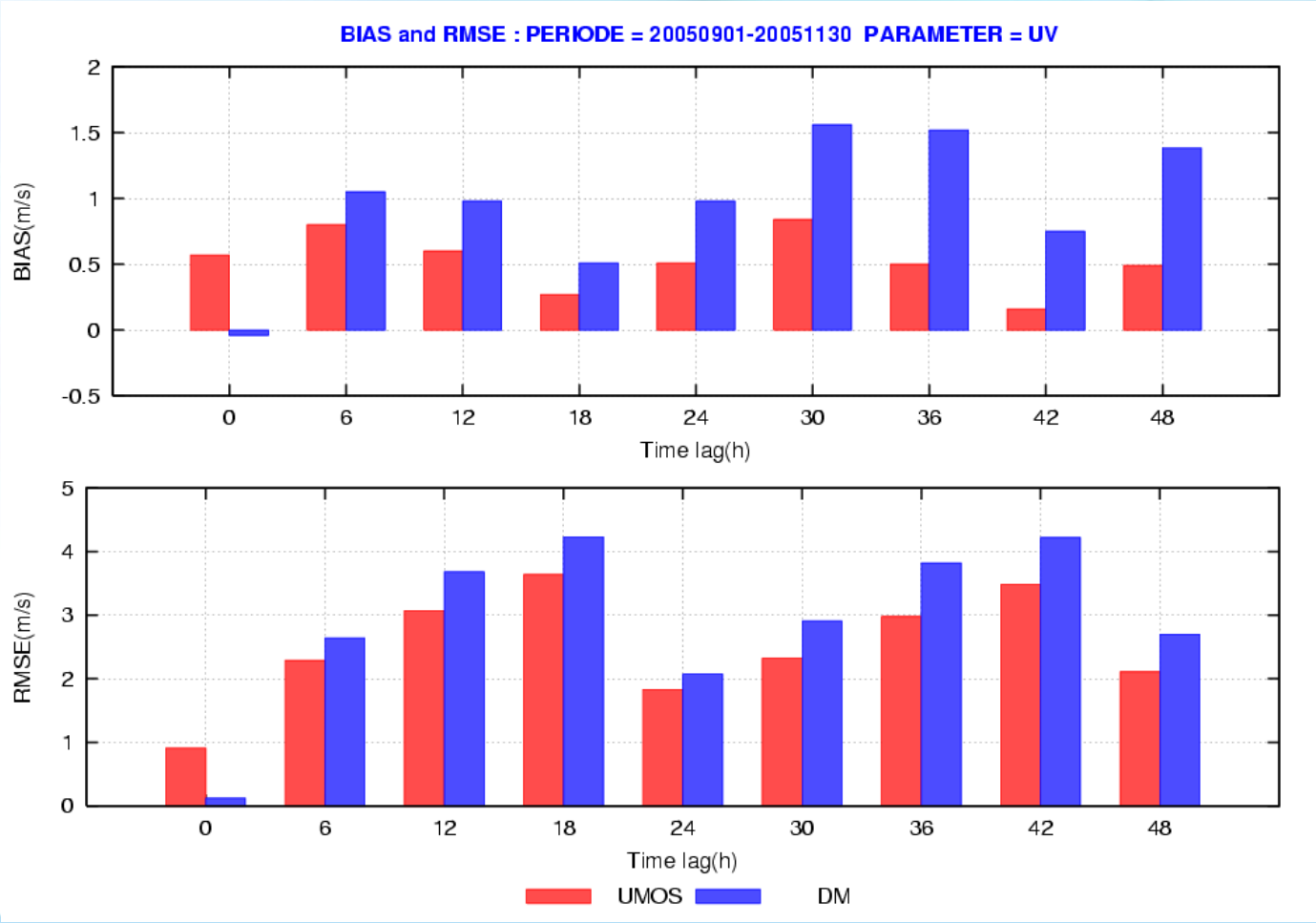




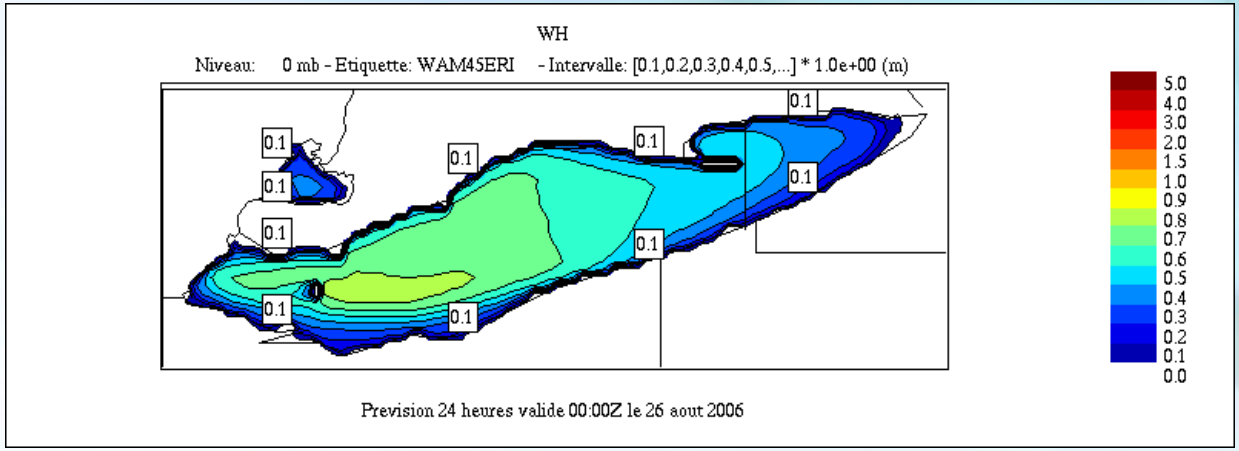
Results of WAM for L. Erie

- Winds verified over 3 months
- Preliminary – 5 day run of WAM
  - Case example

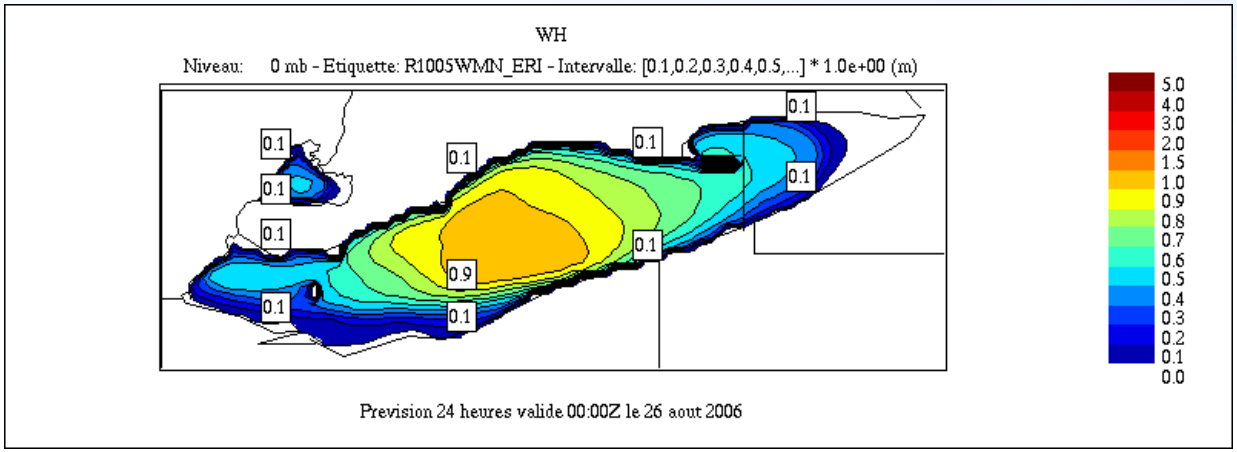
Bias and RMSE, MOS vs GEM, 3 months



Case – 24 h forecast, 00 Aug 26, 06

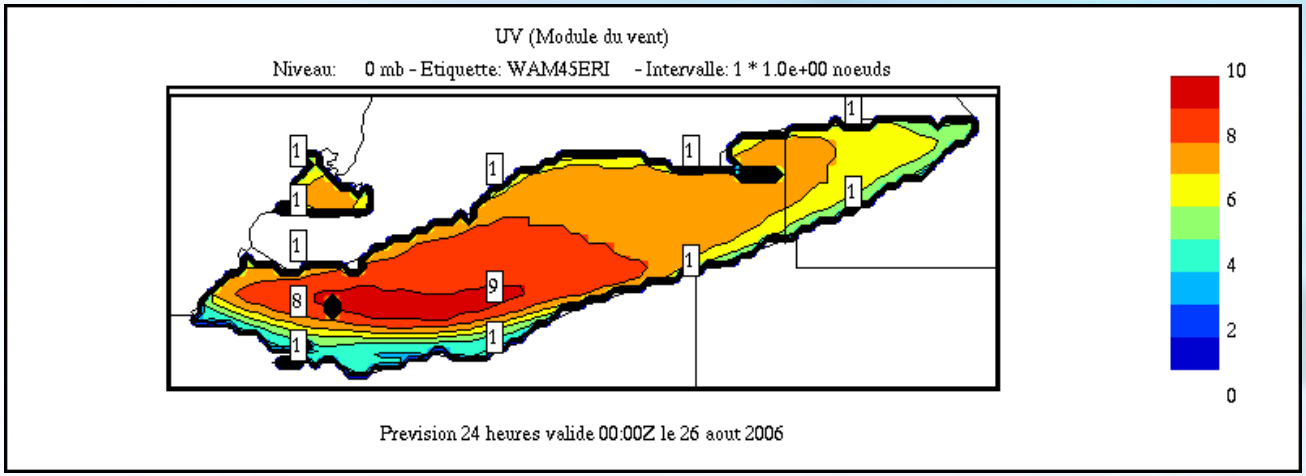


UMOS

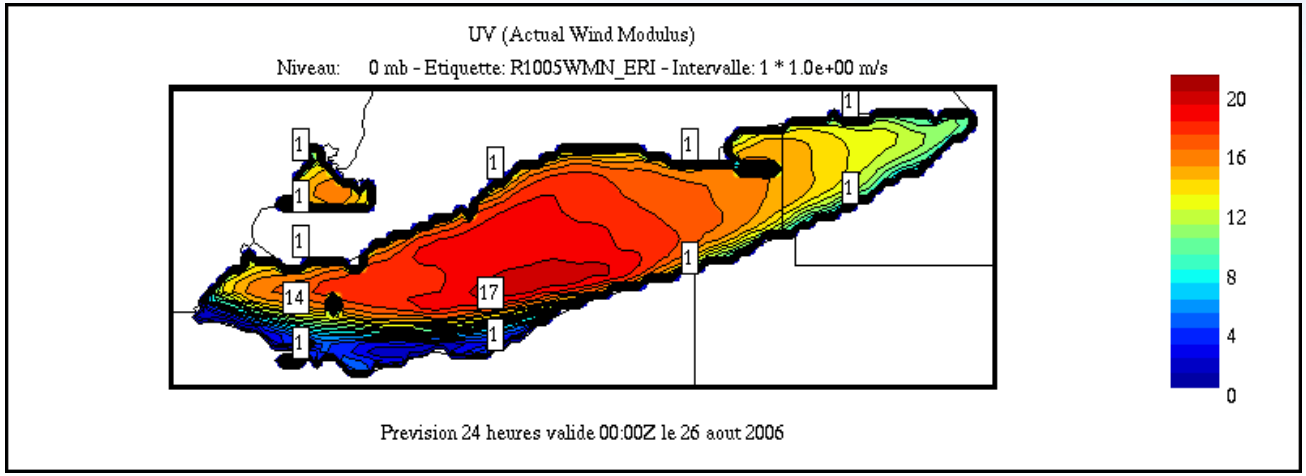


GEM

24 h Forecast Wind Speed – 00 Aug 26, 06

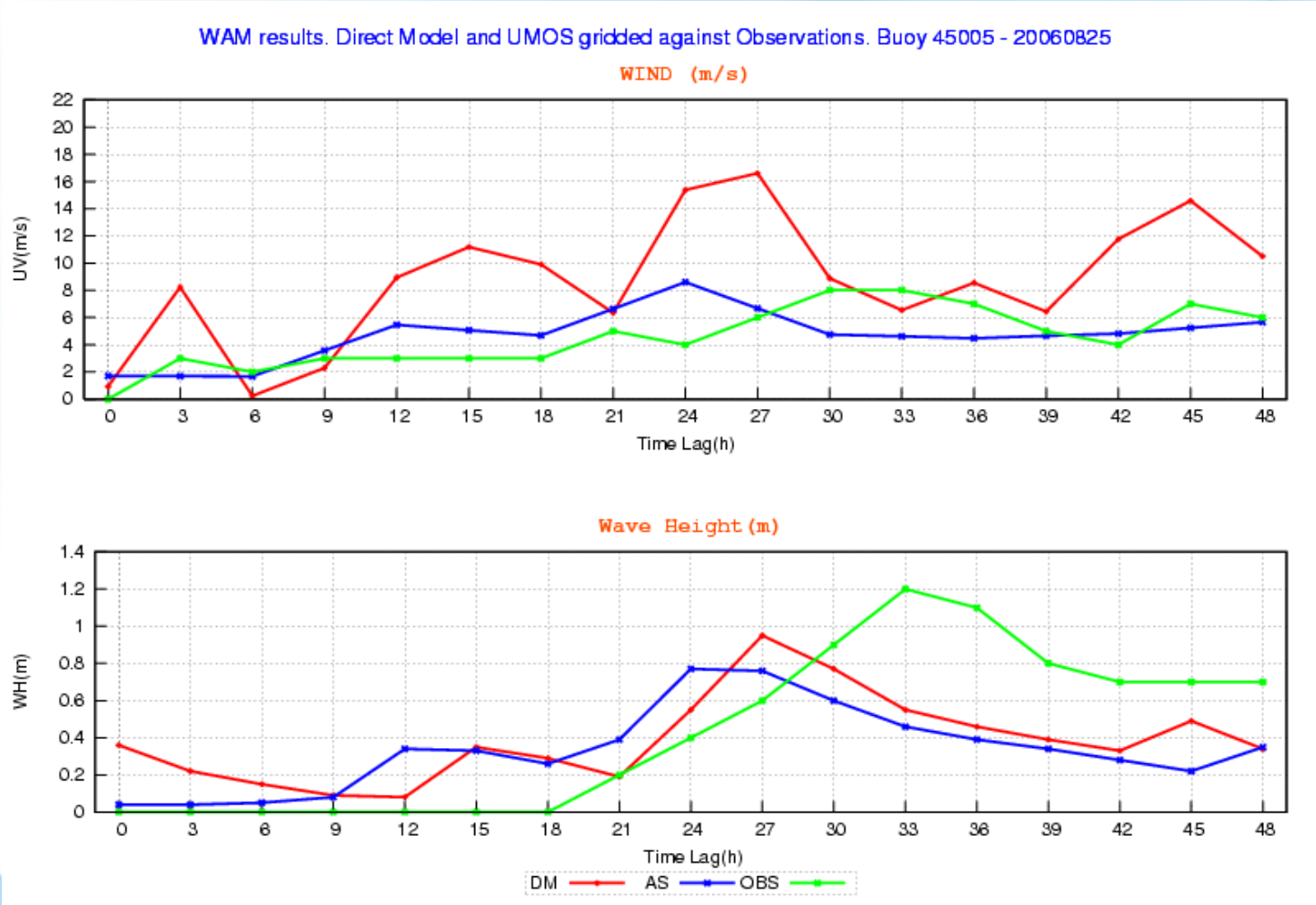


UMOS



GEM

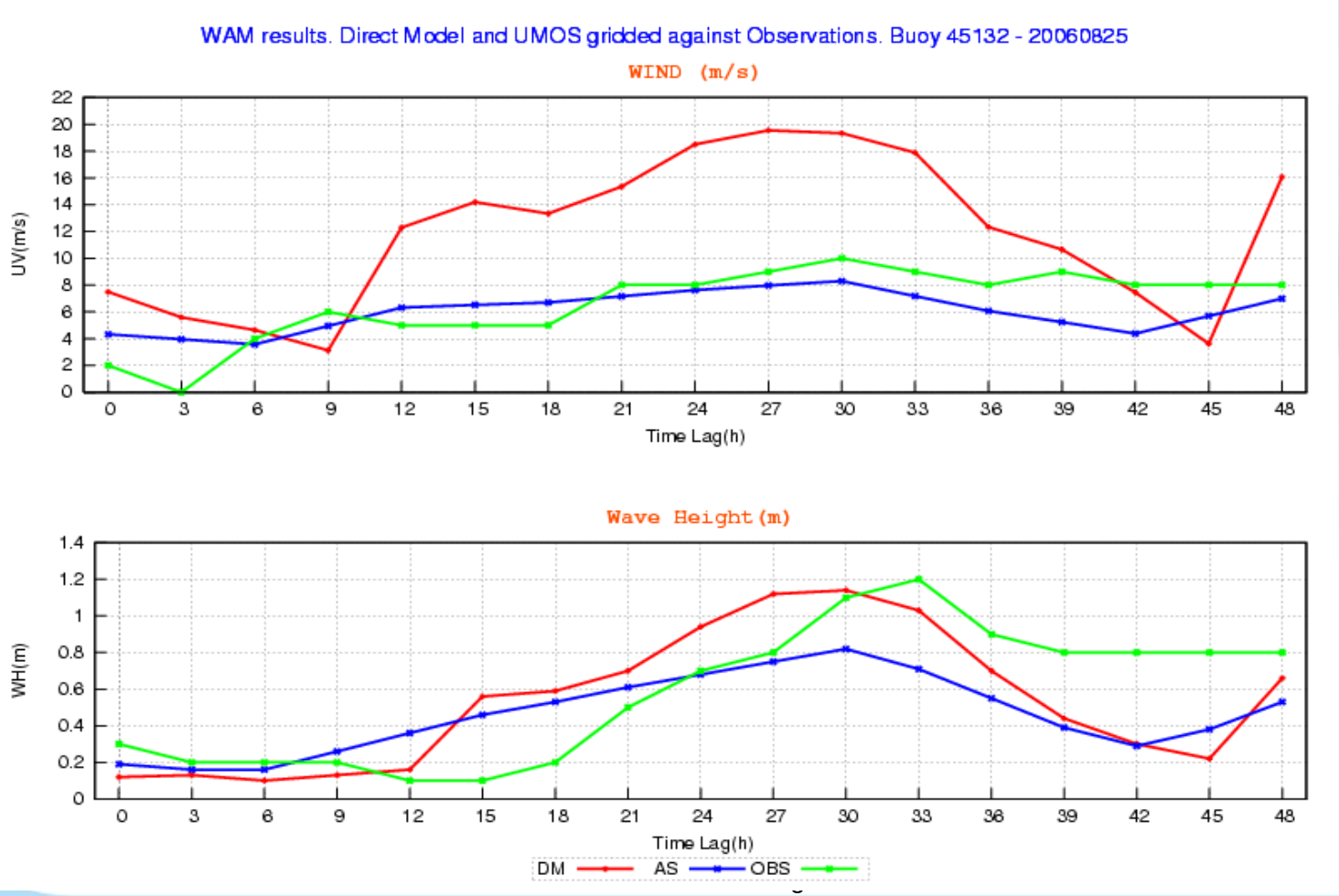
Wind/wave timeseries – buoy 45005



Wind

Wave Height

Wind/wave timeseries – buoy 45132



Wind

Wave Height

Conclusions and next steps

- Conclusions:
  - Significant differences sometimes in waves from MOS compared to model
  - Improved winds not necessarily lead to improved waves
- Next steps:
  - Complete tests of WAM with MOS winds for E and W coasts
  - Assessment on sufficiently large dataset

Thank you!